

## HEAT STRESS IN URBAN AND SUBURBAN LANDSCAPE AND ITS SPATIAL DIFFERENTIATION ON THE EXAMPLE OF A MEDIUM-SIZED CENTRAL EUROPEAN CITY

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Keywords: environmental hazard, urban climate

**Abstract:** In accordance with researches focused on recent climate warming in the Central Europe, the study of heat stress in urban and suburban landscape in this region is indicated as an important topic. Based on measurements of station network in Olomouc (Czech Republic), the temporal and spatial variability of heat stress in the Olomouc region was analysed. We can find limits of temperature and so called Humidex negatively affecting the human organism in the literature. Due to detailed statistical analysis of collected data it was possible to recognize significant differences between locations registering long periods of high temperatures and locations with long periods of critical values of Humidex. The longest period with exceeding the threshold temperatures were occurred in the mixed areas of open midrise development (LCZ 5) and open spaces with low proportion of built-up areas (LCZ 9). Areas connected with a long periods of critical values of Humidex besides high temperatures are also influenced by high evaporation associated with irrigation, waterlogged soil and water bodies. On the other hand, the shortest period of critical values of Humidex were identified in the city centre with dense pattern of midrise building (LCZ2) and in zones suggesting more vegetation, near forests (LCZ B) etc. It indicates that water vapour pressure field does not correspond with temperature field and therefore significantly modifies the spatial and temporal variability of heat stress in the city and its surroundings. Consequently, the further research of spatial variability of humidity in areas with a high population density is required.

## THERMAL COMFORT OBSERVATIONS IN THE CITY OF NOVI SAD (SERBIA) IN 2014

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Keywords: local climate zones, monitoring network, Serbia, thermal comfort

**Abstract:** Urban climate monitoring systems was established in Novi Sad (Serbia) in 2014. This system is based on the Local Climate Zones (LCZ) classification system, GIS model calculations and field work.

In the built-up area of Novi Sad (55 km<sup>2</sup>) 7 LCZ types and 2 LCZ land cover types in nonurban environment in the vicinity of the city were delineated. 27 stations equipped with air temperature and relative humidity sensors were distributed across all LCZs. This system provided 10-minute measured temperature and relative humidity data, as well as calculated human comfort (Psychologically Equivalent Temperature - PET) index values since June 2014. Suitability of the developed monitoring system for human comfort observations in different built-up areas of the city and its surroundings was investigated.

Preliminary results showed that during heat waves PET index had surplus values (>6°C) in midrise LCZ type compared to the nonurban areas (LCZ D – low plants), while human thermal comfort differences among other built-up LCZs were smaller. As expected, largest differences occurred during evening and nocturnal hours.

## “ENVIRONMENT TO CIRCULATION” AND “CIRCULATION TO ENVIRONMENT” APPROACHES IN THE ANALYSIS OF ROLE OF SYNOPTIC CONDITIONS AND WIND REGIME IMPACT ON PM CONCENTRATION OVER THE METROPOLITAN AREA OF HAIFA, ISRAEL

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Keywords: climate change, particle matter, pollution

**Abstract:** Relatively high Particle Matter (PM) concentrations, detected over the Middle East and Israel, are attributed to natural dust outbreaks as well as to local and remote anthropogenic sources. The spatio-temporal distribution of the pollution is highly dependent on the geographical characteristics of the region, such as the complex terrain of Haifa, the nearby bay structure and the atmospheric conditions determined by the combined meso-, local and synoptic-scale circulations. Yuval and Broday (2006) showed that while dust outbreak events are excluded, heavy traffic load is a main source for PM<sub>10</sub> in the Haifa metropolitan area, though this area has major industrial plants, including the national petroleum refineries, petrochemical and agrochemical industries.

The present research analyzes the role of synoptic conditions and wind regime in the temporal and spatial distribution of PM<sub>10</sub> and PM<sub>2.5</sub>. The “environment to circulation” approach is adopted (following Yarnal 1993, Yarnal et al. 2001 and Dayan and Tubi 2012) through the “pollution potential” regarded as percentage of exceeding days for each regional synoptic type. This is based on the classification of Alpert et al. (2004). In order to get insight into the relevant mechanisms, the diurnal evolution of the wind field for each synoptic type is derived and analyzed, expressing the “circulation to environment” approach.

Generally, exceeding days of PM are dominated by natural dust outbreaks even in this highly industrial area. However, its spatial distribution within the study area may point at the contribution of local sources. Detailed results will be further presented.